RESTRICTED CIRCULATION

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AGRICULTURAL MEMORANDUM NO 837

A NOTE ON THE APPARENT RELATIONSHIP BETWEEN THE 'ELAPSED' EFFECTIVE TRANSPIRATION AND THE NUMBER OF CUTS OF GRASS FOR SILAGE IN A SEASON

As part of the work in collaboration with the Permanent Pasture Group (PPG) calculations of effective transpiration were made for about 70 sites in the West Midlands for the 1974 and 1975 seasons. PPG supplied information on what farmers did in the matter of cutting grass, dates and fields etc. Some farmers cut once only but quite a number of others made 2 or 3 cuts of the same field in a season. Those that did cut 3 times were mostly located in Cheshire. There was no information as to why the farmer cut a field at a certain time but it was assumed that the weather for cutting was right and the crop looked right.

Starting from the, perhaps, naive assumption that equal growth (for bulk) requires equal transpiration arrangements of the effective transpiration figures were prepared so that the totals of effective transpiration between any 2 periods could be calculated quickly (Fig 1). If the account was started at 1 April it turned out that where more than one cut was made the cumulative effective transpiration to the first cut was about 130 mm + or - 10 mm. Where the figure was substantially in excess of this (ie the cut was late in the season) the farmer rarely recorded a second cut.

After a cut, the cumulative effective transpiration account was started again from zero and continued until the next cut, and so on. The cumulative effective transpiration in the elapsed time between cuts was generally very similar for any one farm and not too dissimilar between farms in the same area, so it looks as though there may be some connection between the effective transpiration and what the farmers did. Whether the bulk was the same from cut to cut, or the nutrition and digestibility values were anywhere near optimum is another matter.

However, if a figure of about 130 mm is used as a coarse first approximation of the cumulative effective transpiration required for a cut of grass for silage it is possible to see why management practices differ from North to South in the West Midlands, and as an illustration values for Ringway and Pershore are shown in the accompanying figure. The effective transpiration is shown for periods of 10 days commencing at the beginning of May. The figures on the long diagonal are for the periods ENDING on the dates shown on the rows and at the heads of the columns. Reading horizontally the figures are the cumulative effective transpiration since the commencement of the period for each row, except that in the extreme left hand column the figure refers to the cumulative total since 1 April. All the figures are shown for Ringway for 1974 but only a selection is shown for the other large squares. The horizontal lines have been drawn where the requisite cumulative ET has elapsed.

It may be seen that at Ringway 3 cycles could have been completed easily in 1974 and with little difficulty in 1975, and in fact this happened at 2 farms, whereas at Pershore 3 cycles might just have been possible in 1974 but 2 only in 1975. In 1976 which was outside the period of the PPG's study and for which figures for the farms are not available, it appears that 2 cuts might have been made at Ringway but there was no chance of more than one at Pershore. It is felt that this interpretation represents fairly well the differences from North to South across the West Midland region during the 3 seasons. It is suggested that in areas where the cumulative effective transpiration reaches about 380 mm or more in fairly even stages 3 major silage cuts of roughly equal bulk might be possible as routine.

The ET was calculated using the method of Technical Bulletin No 16. PT values were derived from monthly values published in current Met 0.8 Bulletins and apportioned according to the proportion of the monthly sunshine experienced in the appropriate 10 day periods. It would now be more appropriate to use MORECS values and the critical values for cumulative ET might need revision.

If ET is related in a fairly simple manner to plant growth and studies of the response by sugar beet to irrigation at Brooms Barn (1) suggest that this may be a fair starting point, then it should be possible to use similar sets of figures to determine the number of possible cycles in horticultural crops such as raddish and lettuce and possibly others.

Any comments or suggestions about this paper should be sent to the author.

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(1) Ref Response by sugar beet to irrigation 1965-1975, Draycott, A. P. and Messem, A. B. J. Agric Sci Camb (1977) 89, 481-493.

EFFECTIVE TRANSPIRATION (mm) — GRASS

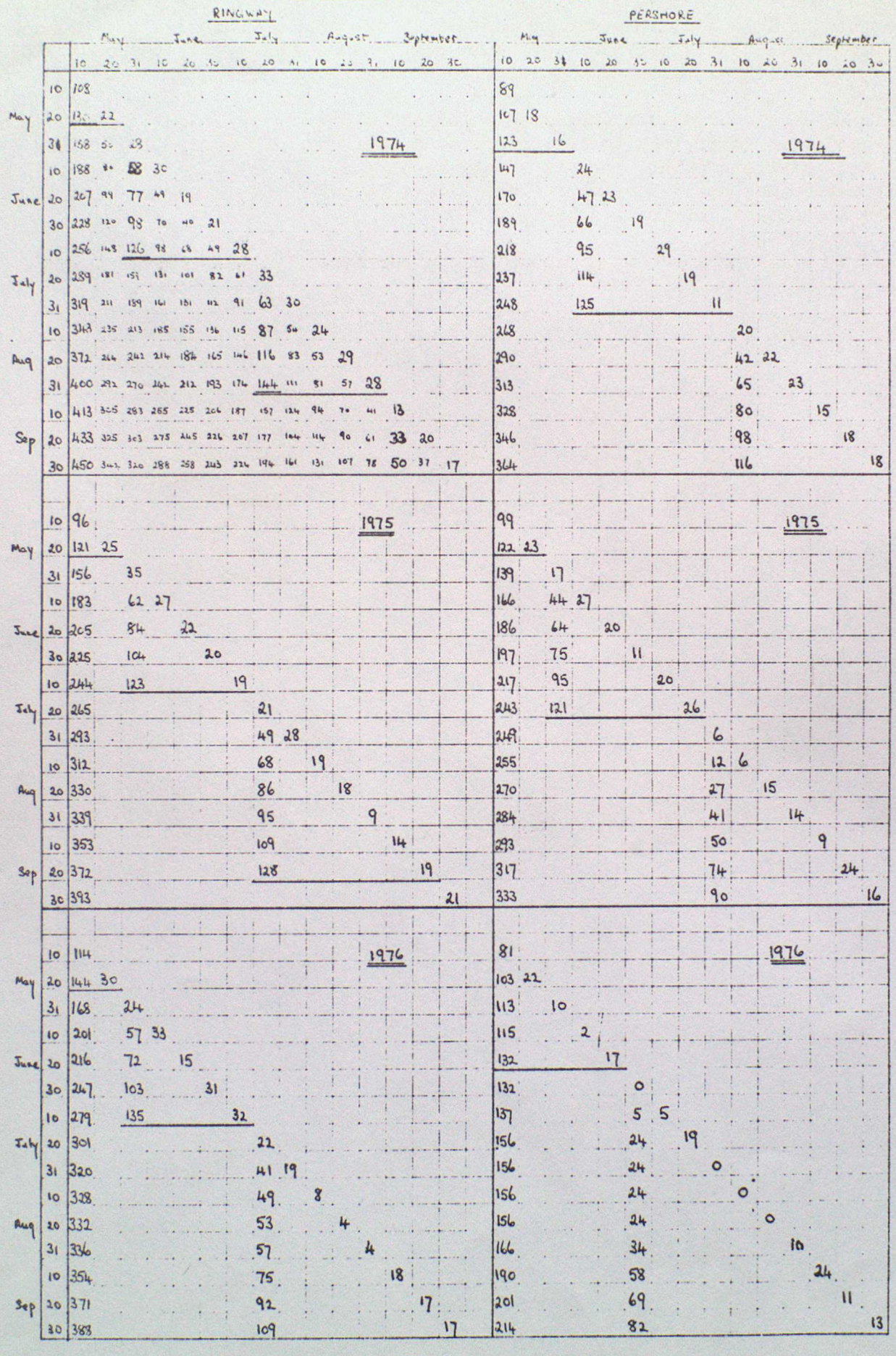

FIG. 1.